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THREE NEW APHIDS OF THE TRIBE CHAITOPHORINI*

A. N. TISSOT

Two of the three species of aphids here described were found feeding on the leaves and twigs of willows in Florida. The third species is rather common on the leaves of some of the oaks.

CHAITOPHORUS LONGIPES, new species

Alate viviparous female. (Plate II, figs. 1-7.) Prevailing color brown. Length of body 2.24 mm. Body and appendages armed with long, straight or slightly curved hairs. Head dark brown; wider than long, without antennal tubercles. Front of head broadly rounded and armed with very long hairs, some having a length of .136 mm., and arising from rather large conical bases. Width of head through the compound eyes .381 mm. Eyes dark reddish-brown with large ocular tubercles. Ocelli large, bordered with very dark brown. Antennae about one-half the length of the body; the first segment dark brown, the second somewhat lighter brown. The basal one-third of the third segment yellowish-brown, the remainder of the third and the whole of the three following segments dark brown. With the exception of the two basal ones the segments of the antennae are definitely imbricated. All the segments of the antennae with a few pointed spines, those of the two basal segments shorter and more curved than the others. The third segment with eight rather small, circular sensoria arranged in a single row that extends almost the full length of the segment; the fourth segment with one sensorium; the fifth with the usual terminal one and the sixth with the usual group at the base of the unguis. The length of the antennal segments as follows: I, .095 mm., II, .054 mm., III, .340 mm., IV, .190 mm., V, .177 mm., VI, base, .095 mm., unguis, .326 mm. Rostrum dark brown; reaching to second coxae.

Prothorax brown, somewhat lighter than the head; other two thoracic segments about same color as the head; wing insertions yellowish. Prothorax with small, dark brown lateral tubercles, and armed with numerous prominent hairs situated on conical bases. Wings long and narrow; hyaline. Fore wing with stigma and veins yellowish-brown. The media twice-branched; the radial sector present, only slightly curved. A row of short curved hairs along the posterior margin of the stigma. Hind wing with two oblique veins. Legs brown; a small basal portion of the

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femora and the middle portions of the tibiae yellowish-brown, the remaining parts dark brown. The legs rather thickly set with mostly straight hairs, those of the tibiae being longest. Length of hind tibiae, .775 mm.

Abdomen light brown with dark brown markings. Along each lateral margin is a row of six dark brown spots more or less circular in outline. Each of the segments anterior to the cornicles has an elongated dark brown area on the dorsal surface; between the cornicles and the cauda are found three dark brown bands extending all the way across the segments. Dorsal and lateral surfaces of the abdomen plentifully supplied with long, slightly curved hairs, the longest being about equal in length to those of the head; the ventral surface with a few very short fine hairs. Cornicles pale yellowish-brown with the apex somewhat darker brown; truncate, widest at the base and tapering rather gradually to the apex. Surface of the cornicles imbricated or faintly reticulated. Width at the base .136 mm., width at apex .054 mm., length .082 mm. Cauda distinctly knobbed with a definite constriction and a large cone-shaped base. Two median and two lateral curved hairs arising from the cauda, the lateral being much the longer. Anal plate straight or slightly rounded, with numerous hairs straighter and longer than those of the cauda. Cauda and anal plate medium brown.

Apterous viviparous female. (Plate II, figs. 8-10.) Prevailing color brown. Length of body 1.72-2.12 mm. Body and appendages armed with numerous long hyaline hairs. Head brown with the anterior margin darker than the remainder. Width of head through the eyes .435-.490 mm. Width of head much greater than the length. Front margin broad; straight or slightly rounded. Head with several long hairs arising from large conical or globular bases. Antennae six-segmented, somewhat over half as long as the body, armed with a few scattered hairs much shorter than those of the head. Basal portion of the third segment yellowish-brown, remainder of the antennae dark brown. Third segment without sensoria, the usual ones at the apex of the fifth and at the base of the unguis of the sixth. Segments III to VI definitely imbricated. Length of antennal segments: III, .286-313 mm., IV, .122-.177 mm., V, .136-.163 mm., VI, base, .082-.095 mm., unguis, .272-.299 mm.

Thorax brown with lateral dark brown areas. Prothorax with small dark brown lateral tubercles. Hairs of the thorax similar to those of the head and of about the same length. Legs brown with the bases of the femora slightly lighter than the remaining portions. All segments of the legs with numerous hairs, those of the tibiae being longest and most numerous. Length of hind tibiae .707-.775 mm.

Abdomen brown, somewhat lighter than the head and thorax, the lateral margins being darker than the other portions. The hairs on the abdomen numerous, those around the margin being the longest found anywhere on the body. Cornicles truncate, widest at the base and tapering toward the apex; the width at the base greater than the length. Surface with faint imbrications. Color of the cornicles yellowish-brown. Cauda definitely knobbed, with a broad conical base and armed with four slightly curved hairs. Anal plate broad; straight or slightly curved with several curved hairs. Cauda and anal plate brown, somewhat darker than the abdomen.

Apterous oviparous female. Prevailing color brown, much as in viviparous female. Length of body 2.2 mm. Body more elongate and less ro-

bust than in apterous viviparous female. Body and appendages with long hyaline hairs. Head brown, darkest along anterior margin. Frontal margin straight or slightly rounded. Width through the compound eyes .422 mm. Head with several long hyaline hairs arising from large globular bases. Eyes reddish-brown with large ocular tubercles. Antennae slightly less than half the length of the body six- or five-segmented (in some specimens the third and fourth segments only partially divided), armed with a few hyaline hairs. The first two segments concolorous with the head, the basal portion of the third yellowish-brown, the remainder of the segments dark brown. Third and fourth segments without sensoria, the usual primary ones at the apex of the fifth segment and at the base of the unguis. Segments III to VI imbricated though III and IV are only faintly so. Length of antennal segments as follows: III, .157 mm., IV, .128 mm., V, .157 mm.; VI, base, .10 mm., unguis, .30 mm.

Thorax brown, the lateral margins concolorous with the head. Hairs of thorax about equal in length to those of the head. Legs brown with the bases of the femora and the middle portions of the tibiae of the first two pairs of legs lighter than the remaining portions. The hind tibiae considerably swollen with numerous scattered and somewhat tuberculate sensoria. The hairs of the tibiae much longer than those of the other leg segments.

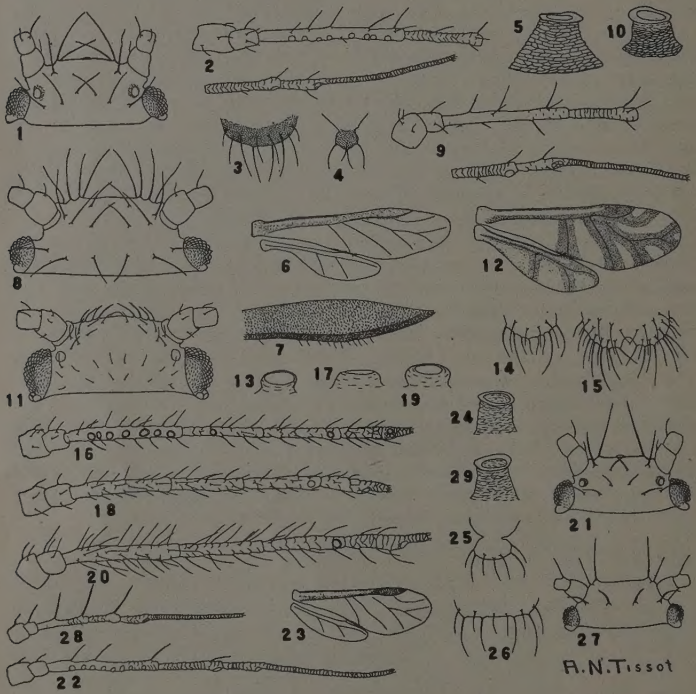
Abdomen brown, somewhat lighter than the head and thorax. The surface of the abdomen armed with numerous hyaline hairs, those around the lateral margin being the longest of the body. Cornicles yellowish-brown, truncate, widest at the base and tapering toward the apex, the surface faintly imbricated. Cauda short, definitely knobbed and armed with a few slightly curved hyaline hairs. Anal plate broadly rounded with numerous hairs. Cauda and anal plate slightly darker than the abdomen.

Type locality: Gainesville, Florida.

Types: Holotype alate viviparous female taken on *Salix longipes* Dec. 13, 1928 (F 434-28), deposited in the U. S. National Museum Collection, Cat. No. 44308. Morphotype apterous viviparous female and morphotype apterous oviparous female, same data as holotype also deposited in the U. S. National Museum Collection. Paratypes in the collections of the Ent. Dept., Florida Agr. Exp. Sta.; of A. A. Granovsky; and in that of the author. Types selected from eight alate females. Type material collected by the author.

Notes: This aphid seems to be rather similar to *Chaitophorus pusillus* Hottes and Frison but differs from that species in the following respects: the abdomen is light brown with dark brown markings instead of yellowish as in *pusillus;* the stigma of the wing is long, narrow, and acutely pointed instead of short and bluntly pointed as in *pusillus;* it feeds largely on the twigs whereas *pusillus* feeds on the leaves. There is another aphid, *Sipha minuta* n. sp., which feeds upon the willow, often in rather close association with *C. longipes.* They can readily be sepa-

rated, however, by their general appearance and habits. The former is much smaller, is yellowish-green and feeds almost exclusively upon the leaves; the latter is decidedly brown in



New Florida Aphids—Plate II

Explanation of Plate II

Chaitophorus longipes n. sp.

Figs. 1-7—Alate viviparous female; 1, head; 2, antenna; 3, anal plate; 4, cauda; 5, cornicle; 6, wings; 7, stigma.

Figs. 8-10—Apterous viviparous female: 8, head; 9, antenna; 10, cornicle.

Patchia obscura n. sp.

Figs. 11-16—Alate viviparous female: 11, head; 12, wings; 13, cornicle; 14, cauda; 15, anal plate; 16, antenna.

Figs. 17 & 18—Apterous viviparous female: 17, cornicle; 18, antenna.

Figs. 19 & 20—Oviparous female: 19, cornicle; 20, antenna.

Sipha minuta n. sp.

Figs. 21-26—Alate viviparous female: 21, head; 22, antenna; 23, wings; 24, cornicle; 25, cauda; 26, anal plate.

Figs. 27-29—Apterous viviparous female: 27, head; 28, antenna; 29, cornicle.

color and rarely feeds on the leaves, being almost always found on the young and tender stems of the willow.

Collections: Salix longipes, Gainesville, Dec. 13, 1928 (F 434-28 and F 435-28), May 18, 1929 (F 530-29), May 16, 1930 (F 641-30), Sept. 18, 1930 (F 704-30); *Salix* sp., Ocoee, July 22, 1932 (F 960-32), (M. R. Brown).

PATCHIA OBSCURA, new species

Alate viviparous female. (Plate II, figs. 11-16.) Prevailing color dark reddish-brown. Length 1.60 mm. Head very dark brown. Width through the compound eyes .449 mm. Anterior margin of the head with several hairs which curve inward; the two middle ones considerably longer than the others. Eyes black, with prominent ocular tubercles. Ocelli bordered with black. Antennae six-segmented, about half as long as the body. First two segments concolorous with the head, remaining segments lighter brown with the apices somewhat darker than the basal portions. Length of antennal segments as follows: I, .068 mm., II, .054 mm., III, .313 mm., IV, .190 mm., V, .177 mm., VI, base, .102 mm., unguis, .048 mm. Right antennae with nine sensoria on the third segment, left antenna with eight sensoria. The sensoria large, circular, and arranged in an even row along the segment. Fourth segment without sensoria. All the antennal segments with prominent hairs, these being most numerous on the third, fourth, and fifth segments. With the exception of the first two segments the antennae are imbricated. Rostrum reaching to the hind coxae; the basal and apical portions very dark brown, the mid-portion light brown.

Prothorax brown, about the same shade as the head; anterior margin about as wide as the head but becoming much wider behind. Posterior lateral margins of prothorax with prominent tubercles. Meso- and metathoracic segments very dark brown with the lobes black. Wings shaded with black. Stigma black; the veins of both pairs of wings bordered with broad black bands, the entire wing surface having a scale-like appearance. Fore wing with radial sector present though somewhat fainter than the other veins; media twice-branched; hind wing with both media and cubitus present. Legs entirely brown, the hind pair darker than the other two. All portions of the legs thickly set with reclining, slightly curved hairs. Length of hind tibia 1.061 mm.; second joint of hind tarsus .128 mm.

Abdomen reddish-brown, with the lateral margins somewhat darker than the remainder. Posterior portion with numerous hairs. Cornicles black; width greater than the length, truncate, somewhat constricted about the middle. Cauda rounded, almost hemispherical. Anal plate bilobed with the indentation shallow. Cauda and anal plate dark brown, with long slightly curved hairs arising from conical bases.

Apterous viviparous female. (Plate II, figs. 17 and 18.) Length 2.00 mm. Body and appendages brown. Head dark brown; eyes black with definite ocular tubercles. Antennae about half as long as the body, six-segmented; light brown at the base, shading to dark brown at the apex. Length of segments as follows: I, .074 mm., II, .061 mm., III, .258 mm., IV, .190 mm., V, .204 mm., VI, base, .136 mm., unguis, .048 mm. Third and fourth segments without sensoria; the usual terminal ones on the fifth

and sixth. All segments with prominent hairs; third to sixth segments imbricated. Rostrum brown; reaching to second coxae.

Thorax and abdomen dark brown. Prothorax with prominent pointed lateral tubercles. Legs brown, hind pair darker than the other two. All parts of the legs with numerous prominent hairs. Length of hind tibia 1.00 mm. Cornicles black; truncate, much wider than long. Cauda rounded, anal plate bilobed. Cauda and anal plate dark brown with many long curved hairs.

Oviparous female.—Plate II, figs. 19 and 20. Color entirely brown, very similar in appearance to the apterous viviparous female. The most noticeable difference between these two forms is the somewhat swollen hind tibia of the oviparous female. This segment of the leg bears a few scattered sensoria.

Type locality: Gainesville, Florida.

Types: Holotype alate viviparous female taken on *Quercus nigra* Apr. 18, 1928 (F 355-28), placed in the U. S. National Museum Collection. Cat. No. 44309. Morphotype apterous viviparous female, Gainesville, Feb. 14, 1929 on *Quercus nigra* and Morphotype apterous oviparous female same data as apterous viviparous female also deposited in National Museum Collection. Paratypes in the U. S. National Museum Collection and in the collections of the Entomology Department, Florida Agr. Exp. Sta.; of A. A. Granovsky, and in that of the author. Type selected from 30 alate viviparous females. Type material collected by the author.

Notes: This species is one of the most common aphids found on the oaks in Central Florida. It does not form large colonies and usually not more than two or three individuals will be found on a single leaf. The alate females when at rest are very conspicuous against the green background of the leaf. The black-banded wings are folded together roof-like and slightly elevated over the back. Apterous females are sometimes found but the alate form is greatly predominant.

Collections: Quercus sp., Micanopy, May 13, 1926 (F 125-26); Monticello, Aug. 31, 1927 (F 260-27), (Walker); Gainesville, Apr. 5, 1928 (F 342-28), (Bratley); *Quercus michauxii,* Gainesville, Apr. 3, 1928 (F 330-28), (Bratley and Tissot); *Quercus nigra,* Gainesville, Apr. 18, 1928 (F 355-28), May 14, 1928 (F 388-28), Feb. 14, 1929, (F 467-29); *Prunus* (?) sp., Lake City, May 27, 1897, (Quaintance); *Liquidembar styraciflua,* Gainesville, May 13, 1927 (F 231B-27). This last collection consisted of a single alate female which probably flew to the sweet gum from oaks growing in the vicinity.

SIPHA MINUTA, new species

Alate viviparous female. (Plate II, figs. 21-26.) Prevailing color, various shades of green; length 0.98 mm. Head dark greenish-brown, margins brown. Width through the compound eyes .340 mm. Front of head with four long hairs, the length of the longest at least equal to the combined lengths of the first two antennal segments. Eyes dark reddish-brown with large ocular tubercles. Ocelli bordered with dark brown. Antennae five-segmented, nearly as long as the body, with a few long, prominent hairs. First two segments greenish, the remaining segments dusky with the apex of the fourth, the basal portion of the fifth, and the apex of the unguis dark brown or black. Third segment of irregular thickness, with eight circular sensoria arranged in a single row; fourth segment with one sensorium near the apex. Segments three to five imbricated. Length of the antennal segments as follows: I, .068 mm., II, .041 mm., III, .272 mm., IV, .163 mm., V, base, .095 mm., unguis, .340 mm. Rostrum light brown, tip black; reaching to second coxae.

Thorax pale green, lobes olive brown, wing insertions yellowish. Prothorax without lateral tubercles; with several curved hairs much shorter and finer than those of the head. Wings hyaline. Fore wing with the media twice-branched, radial sector present, only slightly curved; stigma hyaline or faintly dusky, veins faint. Hind wing with the oblique veins very faintly indicated. Legs greenish or slightly dusky, the apices of the tibiae and the tarsi light brown. Hairs on the legs short, fine, and hyaline. Length of hind tibia .530 mm.

Abdomen very pale yellowish-green with a few bright green markings. Hairs of the abdomen hyaline, somewhat longer than those of the thorax. Cornicles truncate, slightly longer than wide, faintly imbricated; pale green, somewhat dusky at the apex. Cauda distinctly knobbed, with a few curved hairs. Anal plate entire, rounded, with several prominent hairs. Cauda and anal plate green.

Apterous viviparous female. (Plate II, figs. 27-29.) Prevailing color yellow. Head, thorax, and abdomen all a uniform yellow without markings. Eyes red. Antennae five-segmented; the first two segments same color as the head; the third, the basal portion of the fourth, and the basal half of the unguis, yellowish-brown; the apex of the fourth, the base of the fifth, and the apex of the unguis, darker brown. Rostrum brown, black-tipped; reaching to third coxae. Legs a uniform yellowish-brown. Cornicles yellowish-brown, apical portion darker than remainder; length somewhat greater than the width; surface of the cornicles faintly imbricated. Cauda and anal plate concolorous with the abdomen; cauda distinctly knobbed, anal plate entire, almost straight. Hairs on body and appendages hyaline, dusky-tipped. A study of ten apterous females gave the following measurements: length of body .707-1.04 mm.; width of head through the eyes .258-.313 mm.; length of antennal segments, III, .122-.163 mm., IV, .082-.109 mm., V, base, .068-.082 mm., unguis, .218-.286 mm.; length of hind tibia .299-.367 mm.

Type locality: Gainesville, Florida.

Types: Holotype alate viviparous female collected from the leaves of *Salix longipes* May 16, 1930 (F 460-30), deposited in

the U. S. National Museum Collection. Cat. No. 44310. Morphotype apterous viviparous female, same data as holotype in the collection of the author. Paratypes in the collections of the Entomology Department, Florida Agricultural Experiment Station; of A. A. Granovsky, and in that of the author. Types selected from ten alate females. Type material collected by the author.

Notes: It is with some hesitation that this species is placed in the genus *Sipha*. The species of this genus ordinarily feed on the leaves of grasses and the fact that this aphid feeds on the leaves of a woody plant is in itself unusual. However, the five-segmented character of the antenna, and the form of the cornicles, cauda, and anal plate are quite in agreement with the characterization of *Sipha*, so the willow species is provisionally referred to that genus.

These small, pale green aphids are found thickly clustered on the undersides of the leaves of willows. The apterous females are far more numerous than the alate females.

Collections: Salix longipes, Gainesville, May 16, 1930 (F 640-30) Sept. 18, 1930 (F 703-30), Oct. 8, 1930 (F 717-30); Okahumpka, Apr. 9, 1932 (F 894-32).

FURTHER NOTES ON THE VELVET BEAN CATERPILLAR

As shown by the writer many years ago (Bul. 130, Fla. Agr. Exp. Sta.) *Anticarsia gemmatilis* does not overwinter in north or central Florida, but the moths fly up each summer from the south, usually arriving in the Gainesville area in late July or early August. The insect's inability to overwinter is due to the fact that it does not hibernate. Though the duration of the pupal stage is greatly extended in late fall and early winter, the last moths have always emerged during warm spells in January and, since their host plants are all very sensitive to frost, they were unable to raise another generation. But the past winter no killing frost occurred until March 10, and moths were observed on March 4 (Fla. Entomologist, XV-No. 4 p. 72). But after the frost of March 10, when a minimum of 28°F. was recorded, no more moths were seen until June.

As was to be expected after such a mild winter the moths appeared early in July in large numbers and by August 10 some fields of velvet beans were severely "ragged", soy beans almost totally stripped of leaves and peanuts severely attacked. This is the first time that the moths have been observed to lay eggs on peanuts about Gainesville, although a common occurrence in the Everglades. On September 9 the caterpillars were found as far north as Valdosta, Georgia, but no signs of them were observed at Tifton, Georgia.

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THE RELATION OF HYDROCYANIC ACID GAS CONCENTRATION AND TEMPERATURE TO THE KILL OF THE LARVAE IN HIBERNACULA OF THE PECAN LEAF CASE BEARER, MINEOLA JUGLANDIS (LeB.)

J.M.R.

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INTRODUCTION

One of the pests generally found on pecan nursery stock is the pecan leaf case bearer, *Mineola juglandis* (LeB.). While this insect is not the major nursery pest, it is a pest that can be distributed from place to place on dormant nursery stock. The winter is passed by this insect in tiny silken cases, called hibernacula. These cases are placed on or behind the buds and when sufficiently numerous, these insects are capable of almost completely defoliating the trees when the buds start unfolding in the spring.

A series of fumigation experiments was conducted to determine the relation of hydrocyanic acid gas concentration and temperature to the percentage control of this insect. The work was carried on by the senior author in the fumigation laboratory of the State Plant Board of Florida. The junior author collected the infested twigs and made all determinations of the kill after fumigation.

This is the third of a series of papers dealing with the subject of the relation of concentration of hydrocyanic acid gas to kill (2, 3).

METHODS

The box of twenty cubic foot capacity previously described (1), and a California vacuum fumigator were used for this work.

In accordance with all previous work, gas samples were withdrawn at regular intervals, and analyzed for percent of hydrocyanic acid during the duration of the experiment. The California vacuum fumigator was equipped with sampling tubes, a thermograph, and a water jacketed burette so that accurate dosages could be given.

The experiments carried on in the vacuum fumigator were run at room temperature (52° to 71° F.), with varied dosages, and those in the twenty cubic foot box at room temperature (51° to 71° F.), and also with the box heated with a thermostatically controlled heater (91° to 93° F.), with varied dosages and exposures.

The work was done with infested twigs collected at Monticello, Florida. No attempt was made to keep the twigs alive because under the circumstances they were merely a base for the attachment of the hibernacula and their life or death had no effect on the insects. The hibernacula are tough, thick-walled cases. After fumigation the twigs were shipped back to the junior author who examined them and determined the kill.

DISCUSSION OF DATA

The data concerning the fumigation of the larvae in hibernacula are found in Table I. In the examination of the table particular attention should be given to the length of exposure and temperature during exposure. It will be noted that the lots are separated into groups, all of which received the same dosage but had the length of exposure and temperature varied. The subsequent concentrations and percent control were found to vary with the temperature and dosage.

It will be noticed that in many cases where the dosage, concentration, and length of exposure were the same, the percent control for the higher temperature would be much higher than the percent control for the lower temperature.

It will also be noticed that the shortest exposures were not effective.

SUMMARY

The work here reported shows that a 100% control of the larvae of the pecan leaf case bearer in hibernacula can be attained only with an exposure of at least 30 minutes to a concen-

TABLE I.—FUMIGATION OF THE LARVAE OF THE PECAN LEAF CASE BEARER.

Lot No.	No. of Hibernacula	Dosage ml. HCN	Exposure	Mean % Conc. HCN	°F.	% Rel. Humidity	% Control
1	143	3.5	15 min.	.3943	92	18	99.99
2	140	3.5	30 "	.3862	93	16	100.00
3	105	3.5	45 "	.3848	92	13	100.00
4	147	3.5	1 hour	.3824	93	18	100.00
5	80	3.5	15 min.	.3073	54	80½	00.00
6	135	3.5	30 "	.3294	53	77	2.22
7	52	3.5	45 "	.3365	52	76	3.84
8	81	3.5	1 hour	.3387	52	76	13.58
9	117	1.75	15 min.	.1792	62	36	00.00
10	95	1.75	30 "	.1721	58	36	00.00
11	146	1.75	45 "	.1743	58	36	5.47
12	124	1.75	1 hour	.1796	58	.....	75.80
13	54	1.75	15 min.	.2019	92	18	22.22
14	83	1.75	30 "	.2014	92	15	100.00
15	127	1.75	45 "	.2011	95	15	100.00
16	98	1.75	1 hour	.1893	92	32	100.00
17*	150	20	1 "	.3706	71	.....	100.00
18*	84	10	1 "	.1857	52	.....	4.76
19*	134	5	1 "	.1016	77	.....	90.29
20	112	Check	.....	.....	.....	.....	.....
21	121	7	10 min.	.7159	91	28	95.04
22	129	7	20 "	.7529	93	26	100.00
23	103	7	30 "	.7519	93	26	100.00
24	65	7	10 min.	.6313	61	75	1.53
25	130	7	20 "	.7204	68	63	58.46
26	130	7	30 "	.7201	71	56	100.00

*Vacuum fumigator.

tration of .20% HCN or more when the temperature in the fumigation box is held at 90° F. A control of 100% may be attained in 30 minutes at 71° F. if the concentration is approximately .72% HCN.

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THE EFFECT OF HYDROCYANIC ACID GAS FUMIGATION ON THE SUBSEQUENT GROWTH OF PECAN NURSERY STOCK*

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Hydrocyanic acid gas fumigation of nursery stock is required by many states but its use has been frowned upon by the nurserymen in Florida because they maintained that pecan stock so treated would not grow off as well as stock treated by scrubbing with fish oil soap or other substances to destroy the pests on it.

An investigation of the literature did not indicate that such an effect should be expected, so in 1927 an experiment using 480 Stuart pecan trees was started. They were fumigated in 50 cubic foot atmospheric fumigation boxes with forced circulation[1] with dosages of 7, 10, and 14 cc. of liquid hydrocyanic acid. Each dosage was run at temperatures of 55°-57° F., 75° F, and 95° F. Three lots were also run in a California Vacuum Fumigator at room temperature with dosages of 10, 20, and 30 cc. of liquid hydrocyanic acid.

The twelve lots of trees were planted in twelve rows on the Experiment Station farm with checks so interspersed among them that every fourth tree was a check. The trunk diameter and lineal growth were recorded until the spring of 1931.

*An abstract of a thesis presented to the University of Florida in June, 1932, as partial fulfillment of the requirements toward the degree of Master of Science in Agriculture.

[1]Camp, A. F. Research work in fumigation. The Monthly Bulletin, Florida State Plant Board. 12:217-231. 1928.

TABLE OF DIFFERENCES BETWEEN FUMIGATED TREES AND CHECKS

	1928		1929		1930		1931	
	A X S sq. mm.	Lineal Growth dm.	A X S sq. mm.	Lineal Growth dm.	A X S sq. mm.	Lineal Growth dm.	A X S sq. mm.	Lineal Growth dm.
Lot 1								
Dif.	−18.91	+ 0.17	−39.97	−0.70	−171.06	−16.24	−343.60	−44.85
P. E.	±12.09	± 0.42	±16.83	±1.62	± 45.14	± 5.17	±138.31	±20.94
Odds to 1	2.21	<1	7.28	<1	78.37	26.40	8.48	5.38
Lot 2								
Dif.	+ 7.95	+ 0.52	− 7.60	−0.54	− 31.86	− 4.04	− 95.98	−18.54
P. E.	± 9.92	± 0.22	±14.60	±1.18	± 65.75	± 4.25	± 96.32	± 9.00
Odds to 1	<1	7.28	<1	<1	<1	<1	<1	15.67
Lot 3								
Dif.	− 8.48	− 0.30	−18.32	−2.83	−131.85	− 8.70	−182.06	−22.75
P. E.	± 9.73	± 0.27	±13.13	±1.13	± 65.67	± 3.71	± 76.96	±17.98
Odds to 1	<1	1.18	1.63	9.89	5.38	7.28	7.28	1.39
Lot 4								
Dif.	−25.79	− 1.11	−36.51	−2.47	+ 0.60	+ 1.74	− 42.25	− 2.95
P. E.	± 8.35	± 0.80	±24.50	±1.12	± 71.37	± 3.79	±109.25	± 3.79
Odds to 1	22.26	1.90	1.90	6.26	<1	<1	<1	<1
Lot 5								
Dif.	− 3.51	− 1.24	− 4.49	−0.08	+ 38.48	− 3.38	− 84.98	− 9.25
P. E.	± 8.57	± 0.68	±12.06	±0.96	− 43.32	± 3.26	±101.13	±13.18
Odds to 1	< 1	3.45	<1	<1	<1	1.00	<1	<1
Lot 6								
Dif.	− 3.11	− 0.49	+21.43	−0.79	+159.43	+ 3.09	+174.83	+19.01
P. E.	± 6.76	± 0.29	±12.66	±0.98	− 57.96	± 3.47	± 89.22	±11.52
Odds to 1	<1	2.57	2.57	<1	13.58	<1	4.00	2.57
Lot 7								
Dif.	+15.83	+ 0.26	+59.10	+1.69	+196.23	+ 8.10	+ 98.86	+10.33
P. E.	± 7.50	± 0.26	±13.79	±1.04	± 55.76	± 3.70	± 92.33	±12.72
Odds to 1	5.38	1.00	215.92	2.57	53.95	5.38	1.00	<1
Lot 8								
Dif.	+ 3.17	− 0.15	− 2.26	−2.02	+112.09	+ 1.70	+149.60	+21.92
P. E.	± 5.84	± 0.22	±10.21	±0.88	± 45.23	± 2.34	± 74.95	± 8.79
Odds to 1	<1	<1	<1	6.36	8.48	<1	4.00	8.48
Lot 9								
Dif.	+ 4.77	− 0.50	+ 8.17	−1.47	+ 84.79	+ 5.51	+ 16.17	+15.62
P. E.	± 4.86	± 0.26	±10.80	±0.81	± 42.69	± 3.45	± 75.02	± 9.04
Odds to 1	<1	4.00	<1	3.45	4.00	2.21	<1	2.98
Lot 10								
Dif.	+13.44	+ 0.48	−29.15	−2.17	− 33.34	− 4.75	+ 41.69	+ 6.13
P. E.	± 6.12	± 0.30	±14.22	±1.25	± 60.82	± 4.86	± 86.67	±12.87
Odds to 1	5.38	3.57	4.64	2.98	<1	<1	<1	<1
Lot 11								
Dif.	− 3.86	+ 1.00	−31.16	−2.63	−106.31	−10.48	− 35.10	− 1.53
P. E.	± 5.30	± 0.29	±14.79	±1.24	± 60.22	± 3.89	±107.53	±14.65
Odds to 1	<1	78.37	5.38	5.38	2.98	13.58	<1	<1
Lot 12								
Dif.	+23.90	+ 1.59	−16.37	−3.17	− 63.11	−10.95	− 49.10	− 3.55
P. E.	± 6.93	± 0.65	±21.36	±2.27	± 81.33	± 5.45	±163.11	±18.28
Odds to 1	44.87	8.48	<1	1.63	<1	4.64	<1	<1

A X S=Area of the cross section of the trunk.

Statistical methods applied to the measurements made at yearly intervals did not indicate that a significant difference in favor of the checks or the treated trees was obtained under the conditions of this experiment.

A table of the differences between the checks and the treated lots follows in which differences in favor of the checks are indicated by a minus sign and those in favor of the treated lots by a plus sign. Odds of less than 30 to 1 of course are not considered significant and an examination of the table will show that after 1928, odds of over 30 to 1 occurred only three times and then in the cross sectional area of the trunk only, without a similar effect on the lineal growth. It will also be noticed that this difference does not continue through succeeding years.

It can therefore be concluded that under the conditions of this experiment that fumigation of pecan nursery stock does not have a detrimental effect on its succeeding growth.

BLISTER-BEETLES ABUNDANT IN FLORIDA

J.M.R.

Many of the insects commonly found in Florida have been exceptionally abundant and troublesome this summer. This situation is perhaps largely due to the very mild weather of last winter when most sections of the State experienced a freezing temperature on only two or three occasions. The blister-beetles represent one group in which this condition is particularly noticeable. The striped blister-beetle, *Epicauta vittata* Fabr., has been the most frequent offender and has occasioned the greatest amount of damage though *E. heterodera* Horn, the gray blister-beetle, was concerned in a few instances. Peppers and eggplant have suffered severely from the attacks of these beetles, especially in the region surrounding Gainesville. Sweet potato plantings in the Gulf Hammock section of Levy County have suffered from the depredations of *E. vittata*, some fields being almost completely defoliated. Swarms of these insects have invaded some of the "ferneries" in Northeastern Marion County and have severely injured the growing shoots of the *Asparagus plumosus*.

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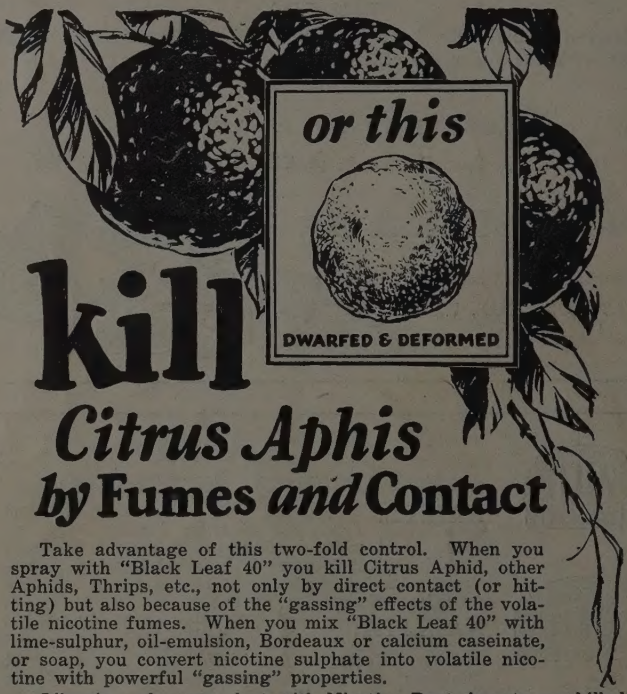

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